



Product Description

The LTG8502 GBIC hot-pluggable multi mode duplex optical transceiver is designed 550 m reach applications in high speed 1062.5 or 1250 Mb/s Fibre Channel or Gigabit Ethernet LAN and SAN optical communications equipment where low-cost, low power consumption, extraordinary performance and reliability are essential. It is housed in an MSA complaint GBIC form factor package with an integral SC duplex optical receptacle and is capable of working from either a 3.3 or 5.0 volt power source. It incorporates the standard TTL / LVTTTL monitor and control functions: Rx_LOS, Tx_Disable and Tx_Fault. The Rx_DATA output and Tx_DATA input lines are differential PECL / LVPECL compatible. It is IEEE 8023z/D2, Fibre Channel FC-PI-2-100-M5/M5-SN-I and ITU-T G.957 complaint. The Class 1 laser transmitter incorporates a high-performance 850 nm F-P optical subassembly, which meets the requirements of the international laser safety standard IEC6082-5. The receiver incorporates a InGaAs PIN photodiode coupled to a high sensitivity TIA that drives the quantizer electronics consisting of the post amplifier, signal detection and TTL logic interface.



Applications

- 1.0625 Gb/sec Fibre Channel data links
- 1.25 Gb/sec Gigabit Ethernet data links
- Channel extenders and data storage networks
- Bus extenders
- High speed I/O file servers
- Storage Area Networks (SANs)
- LANs and RSANs
- Host adopter and mass storage system interconnects
- Switch to switch interfaces and hub interconnects
- Distributed multi processing
- Telecom switches and router interconnects

Features

- Auto Select Power Supply
 - 3.3 or 5.0 Volt Operation
- Low power consumption
- Multi-Mode Operation
- SC Duplex Interface
- 850 VCSEL Laser Transmitter
- GaAs PIN / TIA Receiver
- Hot-pluggable
- 550 m Reach
- TTL / LVTTTL Monitor and Control Functions
 - Rx_LOS
 - Tx_FAULT
 - Tx_DIS
- TTL / LVTTTL Serial ID Functions
 - MOD DEF (0)
 - MOD DEF (1)
 - MOD DEF (2)
- PECL / LVPECL Differential I/O
- Rx_DATA
- Tx_DATA
- IEEE802.3z BASE-SX Compliant
- FC-PI-2-100-M5/M6-SN-I Compliant
- ITU-T G.957 compliant
- IEC60825 Class 1 Laser Safety Compliant
- Operating Temperature Range:
 - 0 to 70 degrees centigrade

HOW TO ORDER

Part Number	Description
LTG8502	1062.5 / 1250 Mb/s GBIC optical transceiver, multi mode, 550 m reach, SC duplex optical receptacle, dual mode power supply, 0 to 70°C operating temperature range



Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	T_{stg}	-40	85	°C	
Operating Temperature	T_{amb}	0	70	°C	
Relative Humidity - Storage	RH_S	0	95	%	
Relative Humidity - Operating	RH_O	0	95	%	
Soldering Temperature	T_{sld}	0	260	°C	
Soldering Time Duration	t_{sld}	0	10	seconds	
DC Supply Voltage	V_{CC}	-0.5	6.0	VDC	

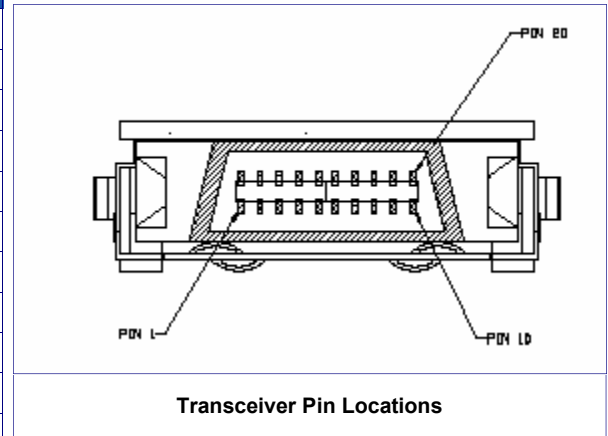
Recommended Operating Conditions						
Parameter	Symbol	Min	Typ	Max	Units	Notes
DC Supply Voltage	V_{CC}	3.15	-	5.25	Volts	
Total Module Supply Current ($I_{TX}+I_{RX}$)	I_{CC}	-	135	300	mA	

Transmitter Electro-Optical Characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical Output Power	P_{OUT}	-9.5	-	-3	dBm	
Extinction Ratio	ER	9.0	-	-	dB	
Center Wavelength	λ_C	770	850	860	nm	
Spectral Line Width	$\Delta\lambda$	-	-	0.85	nm	
Relative Intensity Noise	RIN	-117	-	-	dB/Hz	
Optical Rise and Fall Time	t_r / t_f	-	-	260	ps	20% ~ 80%
Tx_DIS Voltage (DISABLE)	V_{DIS}	$V_{CC}-1.3$	-	V_{CC}	V	
Tx_DIS Voltage (ENABLE)	V_{EN}	V_{ee}	-	$V_{ee}+0.8$	V	

Receiver Electro-Optical Characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Average Received Power (Max)	Pin max	-3	-	-	dBm	
Receive Sensitivity	Pin	-	-	-17	dBm	
Center Wavelength	λ_C	770	850	860	nm	
Optical Return Loss	RL	12	-	-	dB	
Rx_LOS - Assert	LOS_A	-	-	-18	dBm	
Rx_LOS - De-Asserted	LOS_D	-30	-	-	dBm	
Rx_LOS - Hysteresis	-	0.5	-	5	dB	
Data Output Rise Time	t_r	-	-	400	ps	20% - 80%
Data Output Fall Time	t_f	-	-	400	ps	20% - 80%



Pin Assignment					
Pin	Symbol	Sequence	Pin	Symbol	Sequence
1	Rx_LOS	2	11	RGND	1
2	RGND	2	12	Rx_DAT (-)	1
3	RGND	2	13	Rx_DAT (+)	1
4	MOD_DEF(0)	2	14	RGND	1
5	MOD_DEF(1)	2	15	VCC _R	2
6	MOD_DEF(2)	2	16	VCC _T	2
7	Tx-DISABLE	2	17	TGND	1
8	TGND	2	18	Tx_DAT (+)	1
9	TGND	2	19	Tx_DAT (-)	1
10	Tx_FAULT	2	20	TGND	1



Overview of Internal Signal Interface

Receiver Signals			
Symbol	Pin	Description	Notes
RxGND	2, 3, 11, 14	Receiver Ground (may be connected to TxGND in GBIC)	Ground
VCCR	15	Receiver +3.3/5.0 volt (may be connected to VCCT in GBIC)	Receiver DC power
Rx_DATA (-)	12	Receive Data, Inverted, Differential PECL	High speed serial data output
Rx_DATA (+)	13	Receive Data, Non-Inverted, Differential PECL	High speed serial data output
Rx_LOS	1	Receiver LOSS OF SIGNAL Logic LOW indicates NORMAL operation Requires 4.7 K to 10 K Ohm pull up to VCC _R on host	TTL / LVTTTL Receiver monitor
Transmitter Signals			
TxGND	8, 9, 17, 20	Transmitter Ground (may be internally connected to RxGND)	Ground
VCCT	16	+3.3 volt (may be connected to VCCR in GBIC)	Transmitter DC Power
Tx_DATA (+)	18	Transmit Data, Non-Inverted, Differential PECL	High speed serial data input
Tx_DATA (-)	19	Transmit Data, Inverted, Differential PECL	High speed serial data input
Tx_DIS	7	Transmit DISABLE Logic HIGH indicates that the transmitter is DISABLED Requires 4.7 K to 10 K Ohm pull up to VCCT on host	TTL / LVTTTL transmitter control
Tx_FAULT	10	Transmitter FAULT Logic LOW indicates that the transmitter is operating normally Open Collector Requires 4.7 K to 10 K Ohm pull up to VCCT on host	TTL / LVTTTL transmitter monitor
Control Signals			
MOD_DEF(0)	4	Two-Wire Serial Interface - Ground	
MOD_DEF(1)	5	Two-Wire Serial Interface - Clock Input Open Collector Requires 4.7 K to 10 K Ohm pull up to VCCT on host	
MOD_DEF(2)	6	Two-Wire Serial Interface - Serial Data Open Collector Requires 4.7 K to 10 K Ohm pull up to VCCT on host	



Regulatory Information

Eye Safety

The transceiver is a Class 1 eye-safe device according to FDA 21CFR1040.10 and IEC 60825-2.

Electromagnetic Interference (EMI), Immunity and Product Safety

The transceiver is ESD safe (electrical pins) when tested according to MIL-STD-883, Method 3015.7 and ESD safe (optical connector) when tested according to IEC 61000-4-2. The device is immune to strong RF fields when tested in accordance with IEC 61000-4-3. The device complies with (US) FCC, Part 15, Subpart J; (Europe) CENELEC EN 55022; (Canada) Class B (CISPR22A); and (Japan) VCCI Class 1. The device has been designed to conform to product safety requirements including UL1950, CSA 22.2, and IEC 60950-1, and has been designed to meet the flammability requirements of UL94.

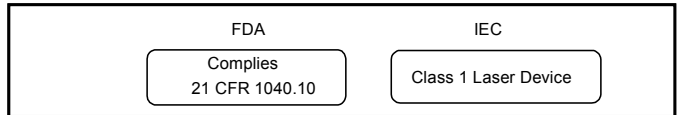
Notice

The factory has made all adjustments to this device prior to shipment. No adjustments or modifications to the device are required or permitted. Any adjustment, modification or tampering of the device voids the product warranty. The US Food and Drug Administration may consider that any adjustment or modification to this device is an act of manufacturing and therefore will require that the device be recertified in accordance with 21 CFR 1040.10 Subpart j.

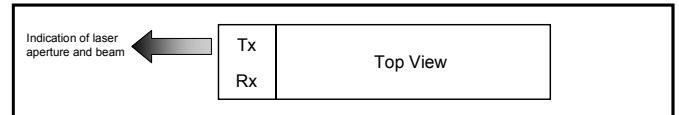
Laser Radiation Information

Wavelength	850 nm
FDA Total Pout: 7 mm aperture at 20 cm distance	< 76 microwatts
IEC Total Pout : 7 mm aperture at 10 cm distance	< 778 microwatts
Beam Divergence	17.58°

Required Label



Laser Emission



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